

Next 2 Page(s) In Document Exempt

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26 August 1964  
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MEMORANDUM FOR: Chief, Forces Division, ORR

ATTENTION: [ ] Defensive Missiles Branch

THROUGH: Chief, Requirements Branch, Reconnaissance Group, CGS

FROM: Chief, CIA/PID (NPIC)

SUBJECT: Angarsk Electronics Site

REFERENCES: (a) Requirement C-RR-4-81,377  
(b) CIA/PID Project C 815-64

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1. This memorandum is in response to your requirement dated 7 May 1964 which requested: (1) Annotated photo of the Angarsk facility as noted on [ ] (2) Description and mensuration of linear installations and associated structures; (3) Line drawings of linear installations and associated structures, indicating roads, trails, power lines, security fencing, ground scarring, etc; (4) Indication of status of construction of each of the linear installations and nature and extent of progress since [ ] (5) Detailed description of face of structure including angle of slopes, length and width of possible faces; (6) Determination of nature and status of third linear installation reported.

2. Mensuration presented in this report was in most part accomplished by the photo analyst, utilizing scale factors derived from specific mensuration performed by the Technical Analysis Branch, TID/NPIC. All dimensions are approximate.

## 3. Introduction

a. The Angarsk Electronics Site (52-53N 103-15E), consisting of Dual Hen House type antennas with adjacent support areas, is one of three known installations of this type under construction in the Soviet Union as of this date. The other two are located at Sary Shagan Antimissile Test Center (SSATC), Instrumentation Site 13 (46-36N 074-32E) and at Olenegorsk (68-06N 033-54E), in the Murmansk area. Though this report is primarily concerned with Angarsk, certain information on the other two sites and the original Hen House installation at Sary Shagan Radar Site No. 1 will be included.

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b. The description of the Angarsk electronics site in this report is based primarily on an analysis of the [ ] photography accomplished on [ ]

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which is the latest available photography as of [ ] Angarsk coverage is the only [ ] cover available of any of the Hen House antennas. Being the first and only coverage of relatively large scale, it permits detailed analysis of many features which are newly identified, though not necessarily new activity.

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c. To facilitate discussion of specific site components, the Dual Hen House facilities at each site are identified alphabetically in the sequence of their appearance. Individual Hen House antenna structures are numbered 1 and 2, with the former being the most northerly antenna. Where support facilities occupy more than a single area, the areas are numbered sequentially.

## 4. History of the Hen House Installations

a. Radar Site No. 1, Sary Shagan Antimissile Test Center, USSR

(1) Prior to the discovery of the Angarsk activity in [ ] the only known Hen House antenna in the Soviet Union was located at Radar Site 1, SSATC (45-59N 073-39E). The activity at Angarsk could not at that early date be confirmed as electronics, though there were some strong suspicions regarding the unusually long excavations for probable structure foundations. In [ ] the original Hen House consisted of a single antenna structure, 890 feet long, [ ] feet wide, housing 40 light toned panels, each measuring approximately [ ] in a face 780 feet long, having a 25-degree bore-sight angle of elevation. Attached to the left side of this antenna structure was a control building, 350 feet long, 50 feet high

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25X1

SUBJECT: Angarsk Electronics Site

M/EB 430/64

and 60 feet wide. A 100 by 70-foot addition, approximately 55 feet high, was constructed sometime between the fall of [redacted] This facility was first photographed by [redacted] Mission [redacted] the only [redacted] coverage of Sary Shagan. Subsequent [redacted] photography has revealed two additional developments: 25X1D 25X1

(a) [redacted] revealed construction work on a new triangular shaped installation adjacent to the Hen House control building. Additional missions in the following months revealed that the new installation consisted of a low, 60 by 95-foot possible equipment building and a smaller suspect "feed house" at the apex of a flat, suspect ground plane. (See Figure 1 below). 25X1D

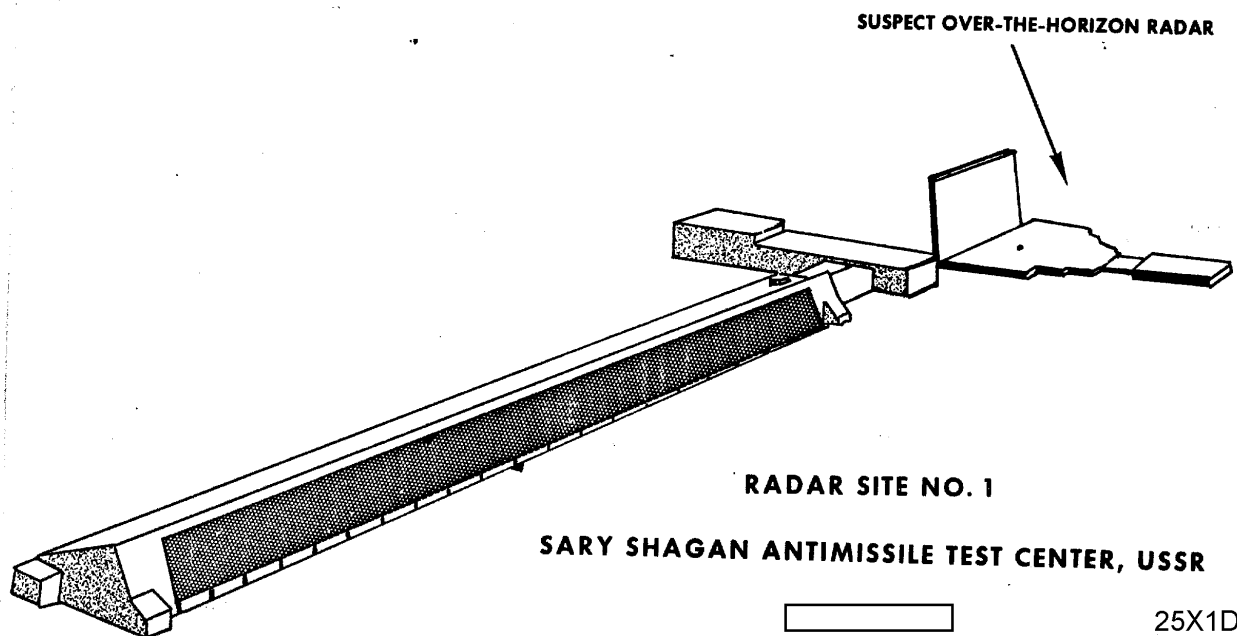


Figure 1.

In plan view, the suspect ground plane appears triangular with stepped or notched sides. Its surface is very light in tone and is raised possibly five to ten feet above the ground. Erected approximately 240 feet away, at the opposite side of the suspect ground plane, is a rectangular suspect reflecting surface approximately 200 feet wide by 100 feet high. The suspect reflecting surface faces on the same azimuth as the adjacent Hen House antenna face. It is suspected that this new addition is an over-the-horizon type radar device, possibly being tested against missiles launched from Chelkar, Makat or Kapustin Yar MTR to the Sary Shagan impact area. (\*) No changes have been noted in this unique facility since up to and including the latest mission, [redacted] 25X1D

(b) Probable modification of the Hen House antenna face, the second development, was first noted on [redacted], when a 190-foot section of the antenna face appeared black. The black section consisted of six regularly spaced panels whose dimensions suggested the replacement of previously installed light toned panels with larger black panels. (Note Figure 2 next page). 25X1D

(\*) Refer to Project [redacted] Report No. 30 (EDL-M626)

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SUBJECT: Angarsk Electronics Site

M/EB 430/64

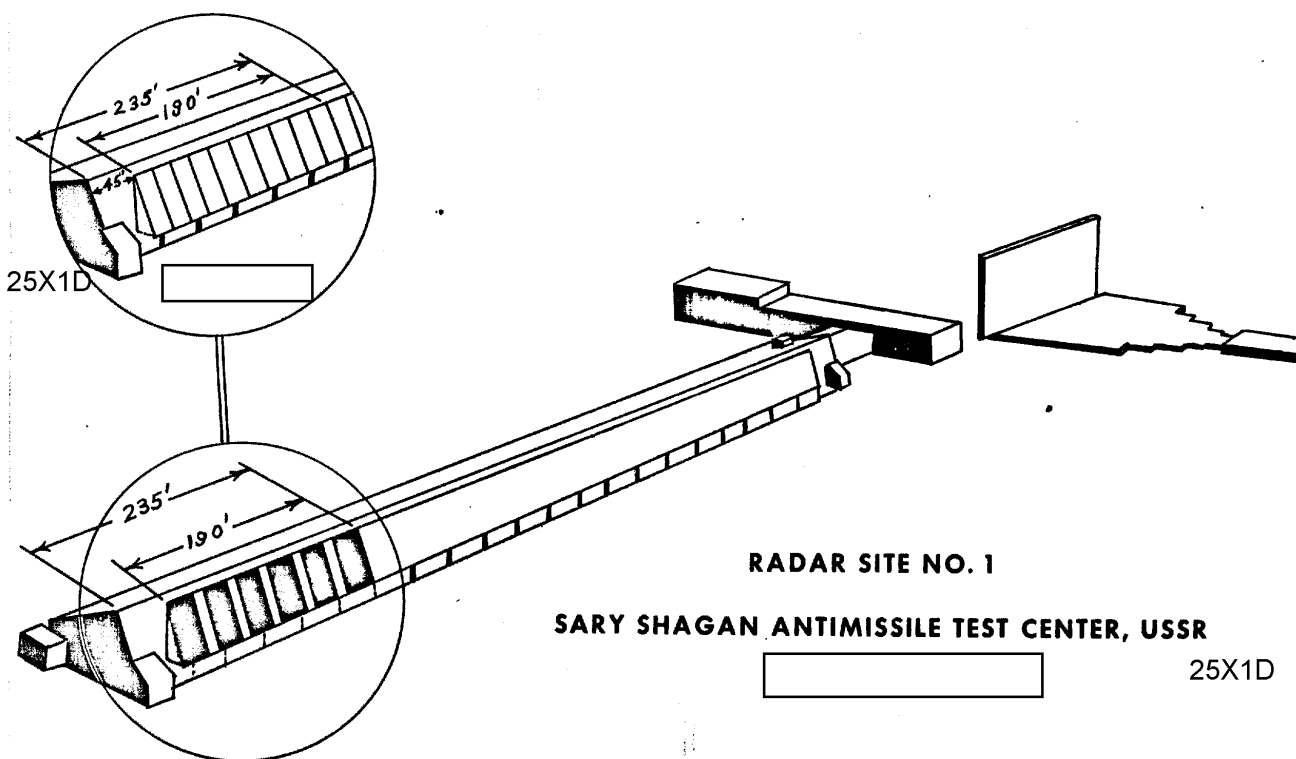


Figure 2.

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25X1D [redacted] confirmed that the entire face was  
 25X1D black, though it is possible the entire face was black when photographed on [redacted]  
 25X1D [redacted] did not reveal  
 25X1D the face of the Hen House due to unfavorable angles of view and relatively poor ground  
 25X1D resolution. [redacted] revealed no change, the face remaining  
 black. Though the [redacted] photography revealed separations between individual  
 black panels, the more recent photography does not permit confirmation of sectionalized  
 paneling, despite relatively excellent [redacted] photo quality. 25X1

b. Instrumentation Site 13, Sary Shagan Antimissile Test Center (SSATC), USSR

25X1D (1) Instrumentation Site 13, located on the shores of Lake Balkhash,  
 25X1D approximately 52 nautical miles northeast of the SSATC Support Base, did not exist on  
 [redacted] when [redacted] photographed the area. First evidence of  
 activity was secured by photography of [redacted]. This mission  
 revealed construction activity on a triad of buildings, which following missions con-  
 firmed as one of four unique installations having a counterpart around the city of

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SUBJECT: Angarsk Electronics Site

M/EB 430/64

Moscow, and believed to be possibly AMM associated. (\*) For nearly two years, while construction activity continued, this possibly AMM associated triad of buildings and a small support area constituted the only significant features at Instrumentation Site 13.

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(2) [ ] revealed that what appeared to be a borrow pit for the past two years was now being expanded by extensive excavation activity. As this new activity coincided with the construction of a new support area south of the building triad, and as the Angarsk facility had not yet been discovered, this new excavation activity was reported without other speculation regarding its possible purpose. Photography [ ]

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[ ] revealed further expansion of this excavation activity. On [ ] Memorandum Report [ ] reported the correlations between this excavation activity and the Hen House facility at Radar Site No. 1, SSATC. (\*\*)

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(3) Photography of [ ] revealed that the Instrumentation Site 13 construction activity had continued at a rapid pace. What is now recognized as Dual Hen House Radar Installation A, was under construction approximately 1,000 yards northwest of the possible AMM associated Building Triad, with a second, similar installation (Facility B) under construction in line with and just south of the first Dual Hen House. A portion of the control house superstructure was erected at Dual Hen House A, while footings for a probably similar building could be seen at the more southern facility. Probable superstructure could be seen at antenna A-1, while footings were probably in place for antenna A-2 and possibly for antenna B-1. The control building for the second Dual Hen House was being constructed approximately 1,000 feet west of the possibly AMM associated Building Triad facility.

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(4) The correlation of unusual construction activity northwest of Angarsk, USSR with the Instrumentation Site 13 activity was reported to the intelligence community early in [ ] The Hen House construction activity at Instrumentation Site 13, which began sometime between [ ] continued throughout the remainder of [ ] and through the winter and spring of [ ] (\*\*\*) Construction of a third Dual Hen House facility (Facility C) was initiated between [ ]

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(5) Photography of [ ] revealed that a dark toned surface was being installed on the face side (the west side) of Hen House A-1. It is suspected that this surface is made up of dark panels similar to those installed on the original Hen House antenna at Radar Site No. 1 in [ ] Boresight from this face would be on an azimuth of [ ]

(6) Construction progress on antenna A-2 is less advanced. Its appearance on [ ] suggested the face would be on the east side of the structure, however, the opposite is true on [ ] Photography of [ ] though of poor quality in this area, reveals the probability that the west side of Hen House A-2 is also receiving black paneling. Thus, boresight from both antennas at Dual Hen House A probably fall to the west.

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c. Olenegorsk Electronics Site, USSR

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(1) Most recent of the Dual Hen House facilities to be discovered is located at 68-06-30N 033-54-30E, approximately 11 nautical miles east-northeast of Olenegorsk Airfield and 55 nautical miles south-southeast of Murmansk. (See Attachment 7). This facility has been negated on [ ] while first signs of construction activity were observed in the support area in [ ]

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- (\*) See Reports: NPIC/R-147/63, NPIC/R-103/64, NPICR-280/64, CIA/PID-13/64 and Memorandum Report [ ]
- (\*\*) See paragraph 4b and Attachment 3 to Memorandum Report [ ]
- (\*\*\*) Memorandum Report [ ] NPIC/R 125/64, NPIC/R213/64, and subsequent [ ] Mission OAKS.

M/EB 430/64

(2) As can be seen in Attachment 7, the Dual Hen House facility at Olenegorsk differs from the others in that the individual Hen House type antennas are not in alignment. The boresight azimuths (perpendiculars to the long side of each structure) form an angle of 30 degrees.

d. Angarsk Electronics Site, USSR

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(1) Late in [ ] an unusual unidentified facility was discovered under construction near the banks of the Belaya River, approximately 35 nautical miles northwest of Angarsk and 17 nautical miles south-southeast of the city of Cheremkhovo, at 52-53N 103-15E. Correlation of this activity with Instrumentation Site 13, SSATC, was established and reported to the intelligence community by cable on 2 January 1964.

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(2) Analysis of previous photography of the area revealed that [ ] probably negated the facility. However, partial cloud cover of what is now Support Area 2 precludes positive negation on this mission. Poor quality of earlier photographic coverage also prevents positive negation. Probably the first indication of construction activity was photographed on [ ]. The photo quality was poor, however, initial clearing and suspect early construction activity in Support Area 2 could be detected.

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(3) The first positive confirmation of construction activity resulted from good quality [ ] coverage on [ ]. This photography revealed that construction of Dual Hen House Installation A had progressed to probable early stages of superstructure erection on the control building, and foundation excavations along the entire length of both antenna structures. At this time there was no evidence of construction or clearing activity for Dual Hen House Installations B, C, or D.

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(4) The progress of construction through [ ] is documented by previously published reports. (\*) To provide for consistent annotations should additional facilities be constructed, the area designation system used in previous reports is changed to permit alphabetical designation of the Dual Hen House installations and numerical designation of support areas, as shown in Attachment 2. The sequence of designation will, where possible, follow the chronological development of facilities.

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(5) Photographic coverage on [ ] was accomplished with the [ ] system, resulting in relatively large scale photography. (See Attachment 1). Though light conditions during the pass over Angarsk were less than optimum, the larger photo scale has permitted a far more detailed analysis than was previously possible. Most line drawings in this report have been made from this photography.

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(6) Mission [ ] photographed Angarsk on [ ]. This [ ] mission was received for analysis as major portions of this report were being finalized. As this mission revealed important new developments, the cut-off date for this report was moved up accordingly.

5. The Angarsk Electronics Site

a. General

(1) This Dual Hen House facility occupies approximately 3,000 acres of flood plane in a bend of the Belaya River. (See Attachment 1). It consists of a fenced operations area, with three Dual Hen House radar installations under construction, with three closely grouped support areas about one nautical mile to the north-east. (See Attachment 2). [ ] revealed a 2,130 by 200-foot area had been cleared for a 4th Dual Hen House installation.

(2) The only cultural features visible at this site prior to commencement of construction activity were a few probable dwellings along the river and a series of straight earth scars. These scars, consisting mostly of suspect survey lines, form a grid pattern in an area covered with medium to sparse vegetation. The grid pattern is formed by parallel lines oriented north-south, spaced approximately 1,000 meters apart, and intersected by east-west oriented parallel lines approximately 2,000 meters apart. Three straight, non-parallel, unidentified earth scars cross the area southwest of the site. These more prominent lines are generally oriented north-east-southwest.

(\*) NPIC/R-213/64 and NPIC/R-125/64

(3) It is not possible to negate these earth scars, nor is it possible to establish any relationship to the Dual Hen House facility, other than their geographic proximity and the orientation of the grid with reference to true north. The northwesternmost of the three more prominent scars runs through the area now occupied by the operations area, and more specifically, by the control building of Dual Hen House A. The latter is possibly coincidental.

b. Communications

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(1) The facility is served by a possibly gravel-surfaced road which enters Support Areas 3 and 2 from the south, then turns to the southwest toward the operations area. There is no other prominent access to the facility as of [redacted] From the site support area the road leads south to join a road which connects Mishelievka on the west to Malta and Tayturka on the east. The latter communities are served by hard-surfaced roads and a double track railroad which connects Irkutsk, Angarsk, and Cheremkhovo with points to the northwest and east. The airfield possibly serving this site would be Belaya Airfield, a medium bomber base, [redacted] located approximately 10 nautical miles to the east.

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c. Defenses

(1) The general area is defended by Cheremkhovo SA-2 SAM Site Bl8-2, located approximately six nautical miles southwest of the Dual Hen House facility, by Cheremkhovo SA-2 SAM Site ClO-2, located approximately 12 nautical miles north-northeast of Belaya Airfield, and the northwestern SAM sites in the Irkutsk Angarsk SAM defense complex.

d. Utilities (See Attachments 3A and 23)

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(1) Two parallel earth scars, which enter the area from the west, are possible evidence of power and telephone lines serving the support areas during the early construction period. Sometime between [redacted] construction work began on an electric power substation in an area approximately 220 by 360 feet located between the operations area and Support Area 2. During the same period, work began on a water treatment plant located between the power substation and Support Area 2. Concurrent with this activity, a trench for a pipeline from the Belaya River to the water treatment plant was dug.

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(2) During the period [redacted] vegetation was cleared from a 110-foot wide strip, forming a power trace leading southward toward the electric power substation from an area north of Support Area 2. The power substation was still in very early stages of construction, with no evidence of structures visible. Initial construction on a probable sewage treatment plant was also initiated during this period.

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(3) Photography of [redacted] reveals construction progress on all utilities. In the electric power substation area, footings for possibly two step-down, three-phase, low-voltage transformers are under construction while wall-bearing construction on a [redacted] substation control house has reached the superstructure stage. Between [redacted] the substation control house and an adjacent building measuring [redacted] were roofed. [redacted] a probable stack of canvas covered building material measuring [redacted] was located approximately 200 feet northeast of the substation control house. This stack of material was not in evidence on [redacted] Foundations for electric power transmission towers for two probable 110 KV power lines with heavy three-phase conductors can be seen along the power trace extending north from the substation. Photography of [redacted] revealed continuing work on the power line with power transmission tower footings newly identified northeast of the Belaya river. The power trace is thus being extended toward the electrified railroad near the town of Mikhaylovka. (See Attachment 1).

(4) A probable sewage treatment plant is being constructed north of Support Area 3 and downstream from the water intake point. It consists of two earth embanked, [redacted] probable digesters and a sewage treatment and pumping station under construction. Between [redacted] the sewer pipeline from the sewage treatment plant was extended to Support Area 2 and to the river Belaya.

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(5) The water treatment plant, consisting of an [ ] single story, flat-roofed building and two 45-foot diameter semi-buried presedimentation basins, will be fed by a buried water pipeline from the Belaya River. Photography of [ ] reveals the circular basins have probably been covered. The intake end of the water pipeline ends at a slip-off slope north of Support Area 2. It is suspected that infiltration galleries are being constructed at that point. Such intakes are designed for drawing water from very turbid rivers and water bodies subject to wide fluctuations in water level. The intake line would normally be enclosed in masonry caissons, extending down to water-bearing gravel, which serves to remove much of the solids in suspension. These galleries are usually located on the shore near the high water line. The water would then be pumped to the presedimentation basins, which are constructed in parallel units so that one will be operating while the other is being cleaned.

From the water treatment plant, water pipeline trenches lead along the access road toward the operations area and toward Support Area 2. A number of trenches for water and sewer pipelines can be seen in Support Area 2. Probable pipe sections can be seen strung along the side of the access road between Support Area 2 and Support Area 3, probably in preparation for trench digging.

#### e. Motor Pool

(1) The motor pool area contains a [ ] single story probable shop type garage and four smaller possible storage buildings. The possible storage buildings have a total of 12,440 square feet of floor space. The motor pool contains eight possible tank semitrailers, 16 possible van semitrailers, 12 possible cargo trucks, 27 probable dump trucks, 40 probable vehicles, 10 possible vehicles, and 10 suspect vehicles for a total of 123 vehicles. The possible tank semitrailers and most of the possible van semitrailers are parked closely together in the western corner of the motor pool, suggesting they are not currently active. The photography of [ ] reveals an expansion of approximately 15 percent to the northern side of the motor pool area (see Attachment 23).

#### f. The Operations Area

(1) The operations area occupies approximately a 400-acre triangular area one nautical mile southwest of Support Area 3. Photography [ ] revealed the area was bounded on the north, west, and possibly the east, by a double security fence. Photography of [ ] confirmed the presence of a security fence around the entire operations area. Clearance between the western side of Dual Hen House installations A and B, and the security fence to the west varies between 300 and 900 feet. A possibly gravel surfaced road connects the operations area with the support areas to the northeast.

(2) Located within the operations area are three Dual Hen House radar antenna structures in various stages of construction. (See Attachment 3). Dual Hen House A is the most complete of the three, while installation C is least advanced. Dual Hen House A occupies the southernmost corner of the triangular area, with the long axis of the structure oriented 350 and 170 degrees. Dual Hen House B, at an earlier stage of construction, is located north of Dual Hen House A, with their control buildings approximately 2,400 feet apart. The long axes of Dual Hen House Installations A and B are parallel and separated by 320 feet. Their control buildings are similarly oriented. Dual Hen House C control building is located approximately 1,800 feet east of Dual Hen House B control building, and approximately 3,100 feet north-northeast of the Dual Hen House A control building.

(3) A clearing for a probable fourth Dual Hen House installation, parallel to Dual Hen House C, was revealed by photography accomplished on [ ] (See Attachments 22 and 23).

#### g. Dual Hen House A

(1) This installation consists of two Hen House type radar structures under construction, one on each side of a massive control building. The two Hen House antenna structures are being constructed along the same longitudinal axis, with the mass of the control building located east of the line. As [ ]



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Dual Hen House A measures 2,295 feet from end to end. Photography of [ ] reveals the probable addition of a small structure to the north end of Hen House A-1. If the dimensions of this addition are similar (\*) to that of the structure off the south end of Hen House A-2, the total length of the Dual Hen House would be approximately 2,340 feet.

(2) The Control Building, Dual Hen House A

The flat-roofed control building is massive and probably constructed of reinforced concrete. (See Attachments 3, 4, and 4A). It consists of a 25-foot high central section measuring [ ] high wings on the north, south, and west, and two probable 10-foot high wings on the east. The north and south wings measure 140 by 40 feet, the west wing [ ] and each of the two probable wings on the east measure 25 by 20 feet. The entire control building is located east of a line connecting the western sides of the two Hen House antenna structures.

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The control building, which has approximately 44,000 square feet of roof area, did not appear complete as of [ ]. Finishing work on the roof appeared to be in progress with a suspect asphalt plant in operation on the east side of the building. Building material, pipe sections and five probable vehicles could be seen in the area on [ ] (See Annotation 12, Attachment 3). Photography of [ ] does not permit confirmation of construction status, though the building appears complete.

(3) Hen House Radar Antenna Structure A-1

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This [ ] structure, located north of the control building, has its long sides parallel to the eastern and western sides of the control building. On [ ] its southern end was separated from the main control building section by 85 feet. (See Attachment 4). Photography of [ ] reveals the possible addition of a small structure between the Hen House structure and the control building. The western side of the Hen House structure is approximately 40 feet forward of the control building.

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Photogrammetric analysis of [ ] coverage has confirmed that the pitch of the trusses is not similar, with the greatest angle of pitch being on the side facing west. Mensuration indicates that the slant height of the western side of each truss is [ ] and the slant height of the east side is [ ]. Possible margins of error on these calculations are: up to a maximum of plus 15 feet for the western slope and down to a maximum of minus 15 feet for the eastern slope. Should the maximum possible error be applied to each side, the ridge line would still be located west of the central longitudinal axis of this structure. Photo quality and available information did not permit computation of the structure height or the angles of elevation of the pitched roof. However, by visual inspection, the ridge line appears to be over a line located approximately two-thirds the distance of the building width, and west of the central longitudinal axis of the structure. (See Figure 3 next page).

The ridge of the Hen House structure appears to be approximately 2.5 times higher than the roof of the control building.

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Photography of [ ] revealed 44 trusses, spaced approximately 20 feet apart, erected over 860 feet of the structure's length, with probably two trusses still to be erected on the north end. (See Attachment 4). [ ] roofing material covered approximately  $3\frac{1}{2}$  structural bays east of the ridge line, as shown in Attachments 4 and 4A. A dark striation could be seen through the trusses, running most of the length of the structure and located parallel to and approximately [ ] from the east side of the structure. Location of the striation is shown in Figure 3 (next page). Photography [ ] reveals that the roof has probably been covered and that a small structure has probably been added to the north end of the Hen House.

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(\*) Though the structures are approximately similar in size, the ground resolution of [ ] does not permit a meaningful measurement.

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M/EB 430/64

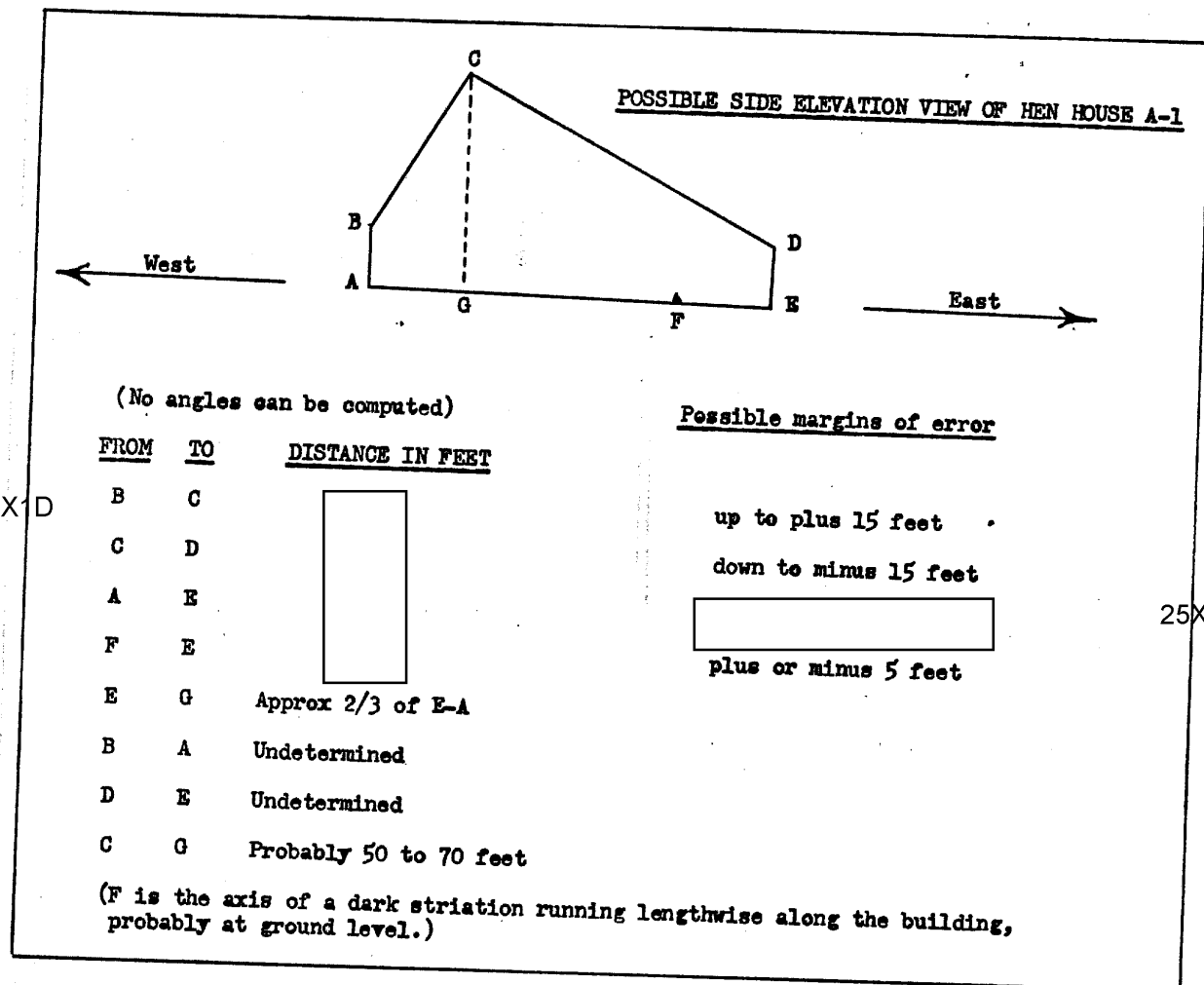


Figure 3.

(4) Hen House Radar Antenna Structure A-2

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located south of the control building, indicated it would be similar in size to antenna structure A-1 to the north. Dimensions and location of footings with reference to the control building are shown in the rectified line drawing in Attachment 4. [redacted] the footings for Hen House A-2, located just off the south end of the footings at Hen House A-2. It is possibly similar to structures which appear off each end of both Hen House structures at Dual Hen House A at Sary Shagan Instrumentation Site 13. It is suspected that the structure on one end of a Hen House could be a transmitter house while the structure on the opposite end could be a terminal house. Three roughly circular possible excavations, with small unidentified objects centered inside, were located between the antenna structure foundation and the control building on [redacted]. The location of these features corresponds to the location of a suspect terminal house which is located between the Hen House structure and the control building at Dual Hen House A, Sary Shagan Instrumentation Site 13. Photography of [redacted] reveals the possible addition of a small structure between Hen House A-2 and the control building.

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Within the outer rows of column footings and parallel to them is a line of possible footings and footing holes, arranged in a straight line and spaced approximately 10 feet apart. This inner row of possible footings is not centered but is approximately [redacted] from the easternmost row of column footings.

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TOP SECRET

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Unidentified structural members, roughly grid shaped striations and other scars can be seen along the length of the structure. These are shown in the line drawings on Attachments 4 and 4A. Photography of [ ] reveals that the superstructure has been erected and that probably some roofing material is being applied.

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#### h. Dual Hen House B

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Dual Hen House B, located north of Dual Hen House A, is in an earlier stage of construction. On [ ] it consisted of a cleared area approximately 2,400 by 300 feet, in the center of which a control building was in early stages of construction. A large amount of construction material was stacked in the area west of the control building and in the cleared area to the south. (See Annotation 4, Attachment 3). Initial excavation activity had commenced in the southern end of the cleared area south of the control building. Photography of [ ] reveals excavation and possible footings for both Hen House structures and construction progress on the control building.

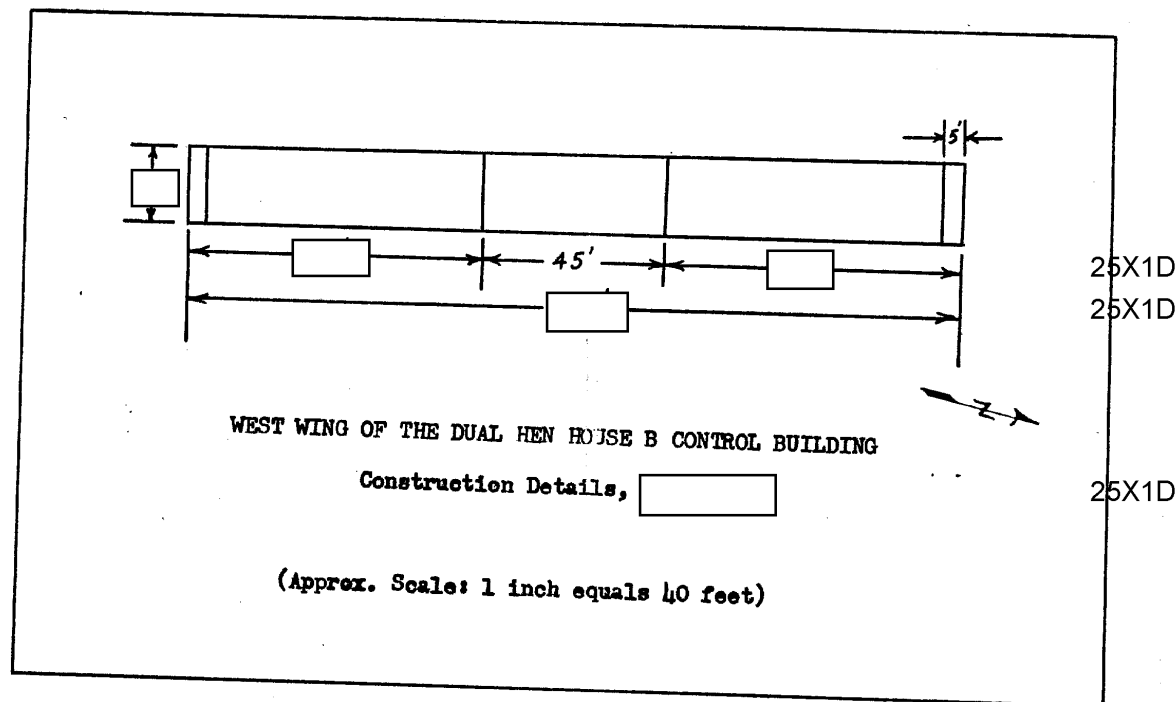
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#### (1) The Control Building, Dual Hen House B

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The control building at Dual Hen House B is oriented in a manner similar to that of the Dual Hen House A control building, and will probably have a similar configuration. On [ ] the walls of the west and south wings were being erected and a small portion of the roof on the south wing was in place. The [ ] west wing appeared to be divided internally by two walls as shown below in Figure 4.



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Figure 4.

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The extreme ends of the narrow west wing were either covered by a five-foot wide strip of roofing, or the walls at this point are five feet thick.

[ ] the south wing of the control building had a section of its roof in place while a [ ] section, noticeably lower than the roof, protrudes as shown in Figure 5.

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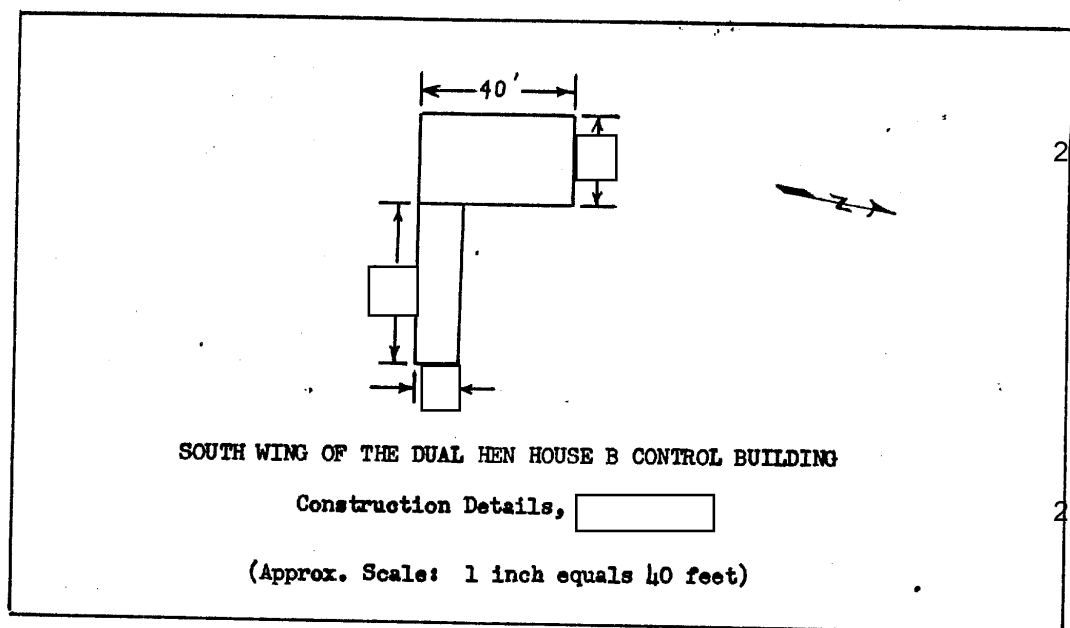


Figure 5.

Though photography of [redacted] does not resolve the small and narrow west wing, it reveals that superstructure and roof on the north and south wing have been erected and that construction on the large central section is progressing. Figure 6 below shows the peculiar appearance of this phase of the construction as it was revealed on [redacted]

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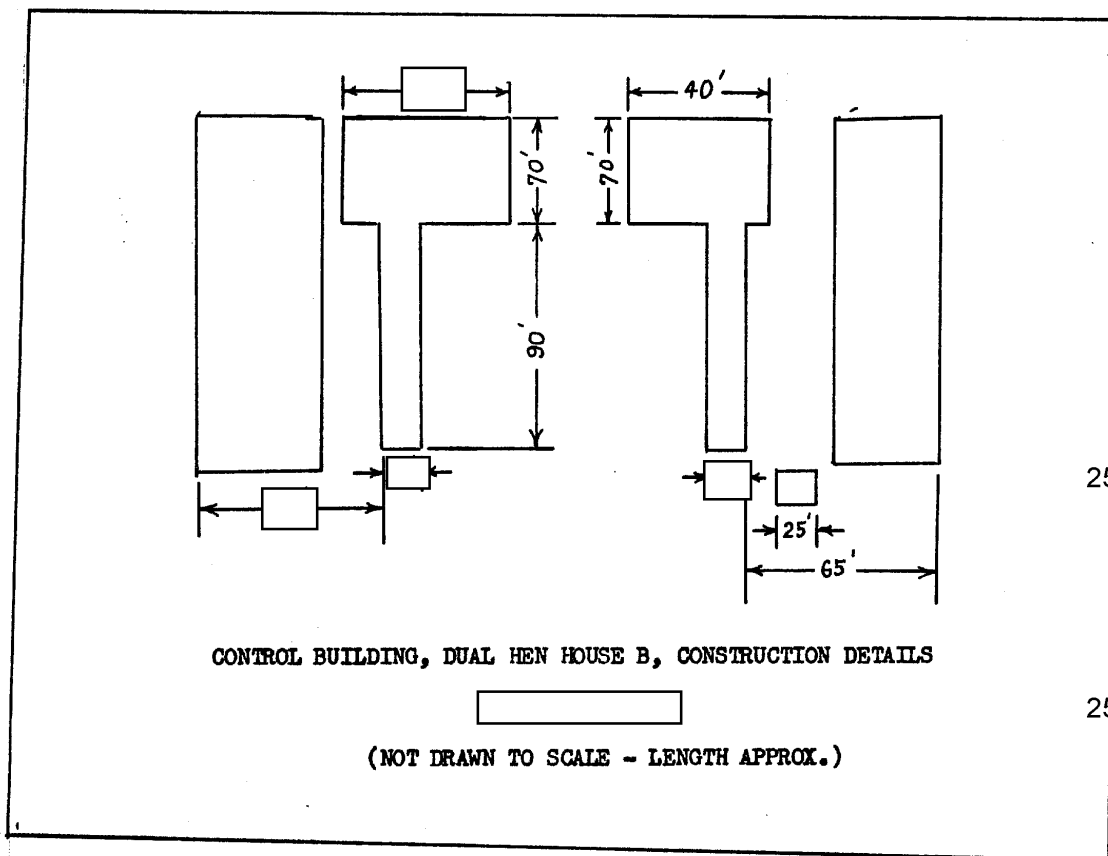


Figure 6.

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(2) Hen House Radar Antenna Structures at Dual Hen House B

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The area cleared to the north and south of the control building under construction is sufficiently large to accommodate Hen House type radar antenna structures; however, as of [ ] only initial excavation activity is visible in the southern end of this area. Photography of [ ] reveals excavation and possible footings at both Hen House sites.

i. Dual Hen House C

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(1) This installation is least advanced of the three Dual Hen House installations being constructed in the operations area. [ ] concrete footings for the control building were in place and stacks of construction materials were lying on the ground in the vicinity. (See Attachment 3). The pattern formed by the control building footings strongly suggested that the control building for Dual Hen House C would have the same dimensions and configuration as the control building at Dual Hen House A. This was partially confirmed by the [ ] coverage [ ] This photography revealed the superstructure of the narrow, probably [ ] wing and the other two wings being erected.

(2) The cleared area to each side of the control building construction is sufficiently large to accommodate Hen House type radar antenna structures; however, as of [ ] there was no sign of excavation activity in the cleared area. Photography of [ ] revealed that excavation for the Hen House foundations had begun.

j. Dual Hen House D

(1) The approximately 2,200 by 200-foot clearing for probable Dual Hen House D is located south of Dual Hen House C and east of Dual Hen House A. The long axis of this clearing is parallel to the long axis of Dual Hen House C. The appearance of this clearing gives the entire operations area a double "V" or chevron configuration.

k. Other Structures and Activity in the Operations Area

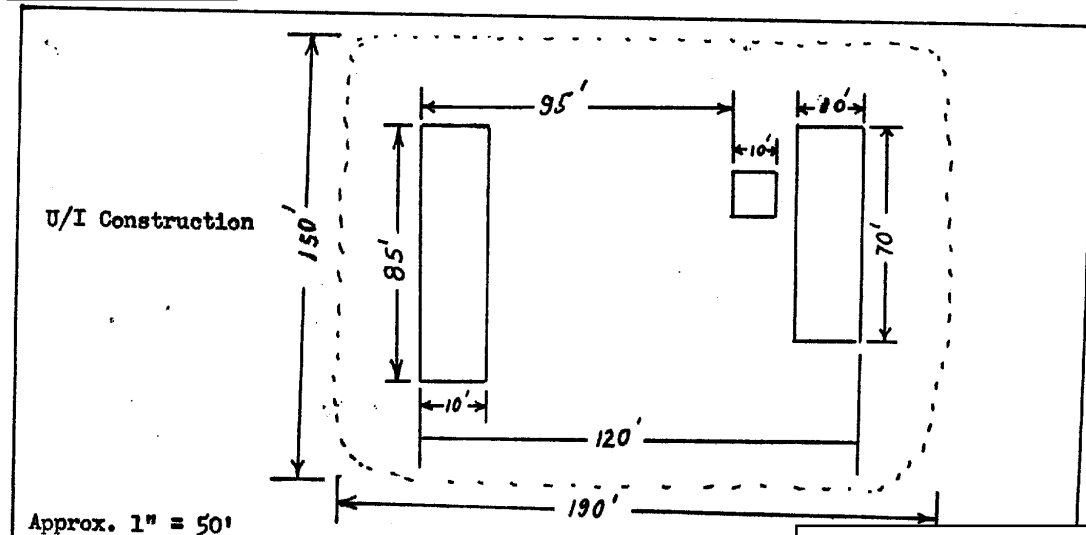
25X1D

(1) On [ ] a number of foundations containing footings for unidentified structures were located in the approximate center of the operations area. (See Annotations 7 through 10, Attachment 3). A standpipe with a capacity of approximately 153,000 U.S. gallons was seen just west of the control house construction at Dual Hen House C, however, there was no evidence of connecting pipelines as of [ ]

(2) Photography of [ ] reveals earth scars connecting the two control buildings at Dual Hen House B and C and possibly the standpipe located just west of the Dual Hen House C control building. Earth scars also connect the control building at Dual Hen House A and construction activity located between the control house and the center of the cleared strip for Dual Hen House D.

25X1D

(3) This construction activity, new since [ ] consists of a cleared area measuring approximately 190 by 150 feet and containing probable footings and some superstructure. Figure 7 below shows the appearance of superstructure visible [ ]



25X1

Figure 7.

M/EB 430/64

25X1D

(4) Approximately similar construction activity, also new since [ ] is located half way between the control building of Dual Hen House B and Dual Hen House C, and adjacent to the connecting earth scar.

(5) The approximate distance between the center of the control building at Dual Hen House A and the center of the cleared area for probable Dual Hen House D is 1,000 feet. The corresponding distance between the control buildings at Dual Hen Houses B and C is 1,800 feet.

#### 1. The Support Areas

(1) Attachment 2 shows the relationship of support areas to the operations area and Attachment 3A is a line drawing of all three support areas with information regarding floor space and construction progress.

(2) The buildings in Support Area 1, Support Area 3, and the western half of Support Area 2 appear to be wooden temporary type barracks and associated buildings. No effort has been made to construct a surfaced road to Support Area 1 or to the western half of Support Area 2. Though track activity indicates that access to these building areas has been primarily by foot, it also reveals that vehicles have probably been in these areas. 25X1D

(3) Intensive construction activity is visible in the central and southeastern end of Support Area 2. Two, and possibly three, tower type construction cranes were photographed in the area on [ ]. One was located adjacent to the construction activity in the steam plant area, and the second, and a possible third were at work in the multi-story building construction area. The dark buildings shown on line drawings in Attachment 2 and 3A represent buildings which were either complete or had walls and roof in place as of [ ]. The structures outlined and not filled in represent buildings in earlier stages of construction, some with only footings in place. Most of the buildings in the central and southeastern half of Support Area 2 appear to be permanent type buildings and construction activity continues on and near most of them. Trenches, construction materials, and approximately 20 vehicles can be seen in the area. Photography of [ ] reveals progress in the erection of superstructure in Support Area 2. Superstructure is now visible on the steam plant, two adjacent structures and an additional multi-story permanent probable quarters in the southeastern end of Support Area 2. 25X1D

#### 6. Azimuths of Propagation

a. Analysis of correlations between the configuration and size of Angarsk Hen House A-1 (See Figure 3 and Attachment 4 and 4A) and the original Hen House at Sary Shagan Radar Site 1, permitted identification of the west side of Angarsk Hen House A-1 as probably the antenna face side.

Initial analysis of the footings at Angarsk Hen House A-2 resulted in a hypothesis that the internal footings might be located directly under the ridge line of the Hen House structure. This suggested that the antenna face on Hen House A-2 might face to the east. Though this supposition seemed to be further supported by the linear non-alignment of excavations seen on [ ] there were considerations which did not support this hypothesis. 25X1D

Further analysis of the Angarsk [ ] coverage of [ ] revealed a dark striation along the length of and probably inside Hen House A-1. It was located approximately the same distance from the east side of the structure as the distance separating the two easternmost rows of footings at Hen House A-2. If this striation corresponds to the internal footings at A-2, it would follow that the internal footings at Hen House A-2 need not necessarily fall under the ridge line. 25X1

Another consideration is masking. If Angarsk Hen House A-2 were to propagate in an easterly direction, Dual Hen House C would cause interference. Furthermore, if similar construction at all other Dual Hen Houses were to follow, it seems that serious masking problems would probably be experienced there as well. Consequently, a re-evaluation of structural features and their relationship was conducted.

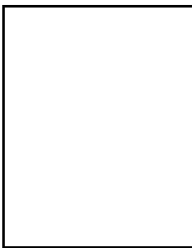
25X1

M/EB 430/64

If both antenna faces at Angarsk Dual Hen House A were on the west side of their respective structures, there would be no masking problem. Assuming, for the sake of this hypothesis, that this will indeed be the method of construction at Angarsk Dual Hen House A, the other Angarsk installations were examined to determine possible correlations, assuming their construction pattern would be similar to Installation A. This examination revealed that it would be reasonable to expect that both Hen House antennas would be on the same side and have their boresight azimuths in parallel planes.

The face side of Hen House structures could possibly be predicted by noting the position of the control house with reference to a line joining the two Hen House structures. Thus, if the face of each antenna at Angarsk Dual Hen House A is on the west side, the entire control building would be to the rear of all propagating surfaces. If the same concept of construction is being followed at Sary Shagan Instrumentation Site 13 (and it probably is at Dual Hen House A, as revealed by [redacted] one can postulate that Dual Hen Houses here would also have their antenna faces on the same side, and have boresight azimuths in parallel planes. This postulation is reasonable because, in each case, the side of the structure likely to receive the face would be in front of the control building and this would eliminate masking problems from adjacent structures.

Consequently, the second hypothesis is considered the more reasonable, and on the basis of this line of reasoning, it is believed that boresight azimuths at all Dual Hen House antennas will possibly be as follows: (Also see Attachments 3, 6, and 7).

<u>Site Location</u>	<u>Hen House</u>	<u>Possible Boresight Azimuth</u>
Angarsk	A-1, A-2, B-1, & B-2	260 degrees
Angarsk	C-1, C-2, & probable D	
Sary Shagan	A-1, A-2, B-1, & B-2	
Sary Shagan	C-1 & C-2	
Olenegorsk	A-1	
Olenegorsk	A-2	

25X1D

25X1D

The arrangement of structures at the Angarsk Electronics Site and the new additions revealed by photography of [redacted] removed more of the doubt regarding the direction of propagation at Angarsk. Therefore, the 260 [redacted] degree azimuths out of Angarsk are changed from possible to probable.

Attachment 8 shows the location of azimuths with reference to each site and other geographic features, plotted on a Gnomonic chart. (\*) In addition to the azimuths from Dual Hen House installations, this map also shows the boresight azimuth from the original Hen House at Sary Shagan Radar Site 1 and the possible azimuth from the Moscow "A Frame" suspect phased array radar, assuming that both faces of the "A Frame" will contain radar antennas. Certain missile ranges and other installations have also been added to the chart.

Though these azimuths have been computed to an accuracy of one degree, most of them are only possible azimuths (\*\*) until photographic or other evidence can confirm the location of each antenna face. Consequently, for research purposes, a list of geographic coordinates along each conceivable azimuth from the Hen House structures has been computed and is attached as Attachments 9 through 21. These geographic coordinates have been computer-determined at regular intervals (usually every 60 nautical miles) along each of the listed azimuths, for a distance of 5,000 nautical miles from the given installation.

(\*) A straight line on a Gnomonic chart represents a great circle arc.

(\*\*) The exceptions: Radar Site No. 1, Sary Shagan azimuth is confirmed and Angarsk Dual Hen House azimuths are probable azimuths.

25X1

SUBJECT: Angarsk Electronics Site

M/EB 430/64

b. A study of Attachment 8 reveals that boresight azimuths (and some back azimuths) go near or through certain related installations. For example, the boresight azimuth from Angarsk Dual Hen House A and B passes very close to Sary Shagan and that from Sary Shagan Dual Hen House C passes close to Angarsk. Consequently, a second computer analysis was initiated to determine the exact distances and azimuths between possibly related points. Attachment 21-A shows the result of this computer analysis.

A study of these azimuths shows that there is a high degree of probability that:

- (1) Angarsk Dual Hen Houses A and B are oriented to place their probable boresight azimuth through Sary Shagan Instrumentation Site 13.
- (2) Sary Shagan Dual Hen Houses A and B are oriented to place their possible boresight azimuth through Tyuratam.
- (3) Sary Shagan Dual Hen House C is oriented to place its possible boresight azimuth through the Angarsk Electronics Site.
- (4) Olenegorsk Hen House A-2 is oriented to place its possible back-azimuth through Sary Shagan Instrumentation Site 13.

If we should hypothesize that the above probabilities are indeed fact, then one of the following conclusions would have to be accepted as correct:

(1) The Soviets surveyed these installations accurately, to have the boresight azimuths line up as suggested in the above stated probabilities and the azimuths computed for Attachment 8 have a slightly higher margin of error than supposed.

25X1D [ ] (2) The azimuths computed for Attachment 8 are accurate to within [ ] and the Soviets did not survey these installations accurately (assuming an intent to have boresight azimuths line up as suggested above).

25X1D (3) The azimuths computed for Attachment 8 are accurate to within one degree, the Soviets surveyed their installations accurately, and the proximity of boresight azimuths to the listed installations is simply coincidental (implying no intention to line up the boresight azimuths exactly with the given installations).

(4) The azimuths compiled for Attachment 8 are accurate to within [ ] the Soviets surveyed the installations accurately, to have the boresight azimuths line up approximately as suggested in the above stated probabilities (implying no intention to have pin-point accuracy).

Of the four possible conclusions listed, the first and the fourth appear to be the most reasonable.

## 7. Discussion

### a. Type of Radar

It is generally believed that the Hen House structures house some type of phased array radar. As the result of one hypothesis, it is suspected that one of the small structures attached to the end of a Dual Hen House serves as a transmitter house and the other as a terminal house. It is possible that such an arrangement would be compatible with a frequency scanned phased array radar.

Another hypothesis concludes that the bulk of the Hen House structure behind the face suggests the use of an array of lenses in the antenna face, with the feed elements mounted internally a given distance behind each of the lens panels. The internal footings at Angarsk Hen House A-2 and the striation inside A-1 could possibly be the location of support elements for the feed of such a lens type system.



25X1B  
25X1B

The size of the original panels at Sary Shagan's original Hen House was approximately [redacted] according to analysis of [redacted] photograph. 25X1  
[redacted] Photograph of [redacted] revealed that 25X1D  
possibly larger panels were being installed (see Figure 2), however, it was not possible to determine the exact size of these panels due to the limitations imposed by relatively poor ground resolution. The fact that a space can be detected between six separate panels would at first suggest that the distance between panels must be between 10 and 20 feet, the probable range of ground resolution for this coverage. However, linearity (considering a probable panel length of 40 feet) would make it possible to detect a smaller separation. The numerical coefficient in this relationship is not known; therefore, it is not possible to determine panel width. Later photography with superior interpretability revealed the entire face as black, however, individual panels could not be detected. This suggests one of three possibilities:

- (1) Wider panels were installed, with distance between panels too small for photo resolution.
- (2) Wider panels were installed with no space between panels.
- (3) The entire face was covered by a continuous sheet of dark material.

b. Back Azimuths

Though the probable and possible azimuths from all these installations are shown on Attachment 8, it is interesting to note that some "back-azimuths" pass through or near some important places. As an example, a back-azimuth from Angarsk Hen House A and B passes near Chita while a back-azimuth from Olenegorsk Hen House A-2 passes near Sary Shagan. Attachment 21A should provide valuable data in regard to azimuths between specific points.

c. Function of the Dual Hen Houses

The location of the Dual Hen House sites at Angarsk and at Sary Shagan suggests that these installations are possibly part of a satellite fence. The original Hen House at Sary Shagan Radar Site 1 was the R and D version; therefore, it is hardly likely that the extensive Dual Hen House installations at Sary Shagan and northwest of Angarsk would be for Research and Development purposes. Furthermore, their location does not appear optimum for an early warning role against ballistic missiles.

25X1D

25X1D

The [redacted] azimuth from Sary Shagan Instrumentation Site 13 passes through Launch Complex A at Tyuratam and the [redacted] azimuth passes within 250 and 275 nautical miles of the centers of Soviet Pacific impact Areas 1 and 2, respectively. These impact areas are approximately 900 and 600 nautical miles south-southeast of Johnston Island. These facts suggest a possibility that Sary Shagan Instrumentation Site 13 Dual Hen House might also be employed in the Soviet space and ICBM test program.

The location of the Olenegorsk Dual Hen House facility, with its possible azimuths of propagation shown on Attachments 7 and 8, suggests either a ballistic missile early warning role or an anti-satellite roll. Though the former is perhaps favored, the latter cannot be ruled out due to orbits we might conceivably use in the future. It is not inconceivable that the site is intended for a dual role.

As regards the possibility of the site at Olenegorsk being part of a ballistic missile early warning system, it is argued, that if true, we must find more installations of the same type going up simultaneously along the northern reaches of the Soviet Union. This is not necessarily true. If we were willing to accept the installation of possible antiballistic missile launch complexes around only two major Soviet cities (Moscow and Leningrad), why wouldn't it be equally logical to accept the idea of an early warning site, so located as to provide warning against missile attack from North America against these and other targets? The political

25X1

M/EB 430/64

gain from establishment of an operational system for even a limited number of important targets would be tremendous. It is therefore possible that the Soviets would press forward to the early realization of such a system, even though its operational effectiveness might initially be rather limited.

d. Relation of the Dual Hen House and the Building Triad at Instrumentation Site 13, Sary Shagan

A functional relationship between the building triad at Sary Shagan Instrumentation Site 13 and the nearby Dual Hen House installation cannot be identified. However, there are some interesting points to consider.

The co-location of the building triad and the Dual Hen House installations may not be coincidental. With the appearance of construction activity at Dual Hen House Installation B, [ ] revealed a 25X1D straight earth scar between the building triad area and the vicinity of construction on the control building of Dual Hen House B. This earth scar was still very prominent on [ ] It appeared to run from an area adjacent to the south side of the large building in the triad toward the control building at Dual Hen House B. It is suspected that this scar is a buried conduit to the control house, passing under the road which runs behind the Hen House construction. |

25X1D

[ ] a straight earth scar could be seen leading toward the Dual Hen House B construction from the north side of the large building in the triad. Partial cloud cover did not permit observing its terminus. The same mission revealed a straight earth scar south of the entire triad, oriented approximately east-west and skirting the southern side of the southern small building of the triad. Photography [ ]

[ ] confirmed the presence of the two scars seen on [ ] The scar seen leaving the area adjacent to the south side of the large triad building on [ ] could no longer be detected. The shorter of the two scars 25X1D still visible has its termini at points south of the large triad building and south-east of Dual Hen House B control building. The longer of the two scars possibly has its termini at points north of the large triad building and close behind the east side of the Dual Hen House B control building. (See photo in Attachment 6). Of course, it is possible that these earth scars are simply signatures of water lines, and thus need not imply functional relationship.

The building triads in the Moscow area have been considered possibly AMM associated, though their use in a pure air defense role has been receiving strong consideration. Their presence at Sary Shagan, which has been repeatedly associated with AMM activity by COMINT, and their installation around Moscow, already heavily defended by a variety of SAM systems, causes retention of the term "possible AMM associated." It is believed this term must be retained until such time as evidence reveals that the Soviets do not plan to introduce an AMM into the Moscow defense system concurrent with the completion of the building triad sites, or evidence reveals that the building triads at Sary Shagan are being tested in a role other than AMM.

8. The photo analyst on this project is [ ] who may be contacted on extension [ ] should you have any further questions concerning this project. 25X1A

9. As this report will be published for maximum distribution, this project is not considered complete.

25X1A

Enclosures:

Twenty-six (26) (See List of Attachments)

25X1

LIST OF ATTACHMENTS

<u>Number</u>	<u>Material</u>	<u>CIA/PID/MEB-P-</u>	
1	Angarsk Map & Annotated Photo	619	
2	Angarsk Electronics Site (Line Drawing)	620	
3	Angarsk Electronics Site, Operations Area (Line Drawing)	632	
3A	Angarsk Electronics Site, Support Areas	633	
4	Dual Hen House A, Angarsk (Rectified Line Drawing)	678	
4A	Dual Hen House A, Angarsk (Perspective View)	680	
5	Original Hen House, SSATC, Map & Annotated Photo	674	
6	SSATC Instrumentation Site 13, Map & Annotated Photo	675	
7	Olenegorsk Dual Hen House Facility	676	
8	Possible Azimuths From Hen House Radars U/C	677	
9	Sary Shagan ATC Instrumentation Site 13,	(none)	25X1D
10	Sary Shagan ATC Instrumentation Site 13,	(none)	
11	Sary Shagan ATC Instrumentation Site 13,	(none)	
12	Sary Shagan ATC Instrumentation Site 13,	(none)	
25X1D 13	Olenegorsk,	(none)	
14	Olenegorsk,	(none)	
15	Olenegorsk,	(none)	
16	Olenegorsk,	(none)	
25X1D 17	Angarsk,	(none)	
18	Angarsk,	(none)	
19	Angarsk,	(none)	
20	Angarsk,	(none)	
21	Sary Shagan ATC Radar Site 1,	(none)	25X1D
21A	Distances and Azimuth Between Possible Related Points	(none)	
22	Angarsk Electronics Site, Operations Area	697	25X1D
23	Annotated Mosaic of Angarsk Elec. Site	698	25X1D